ELECTRICITY ON THE FARM Magazine

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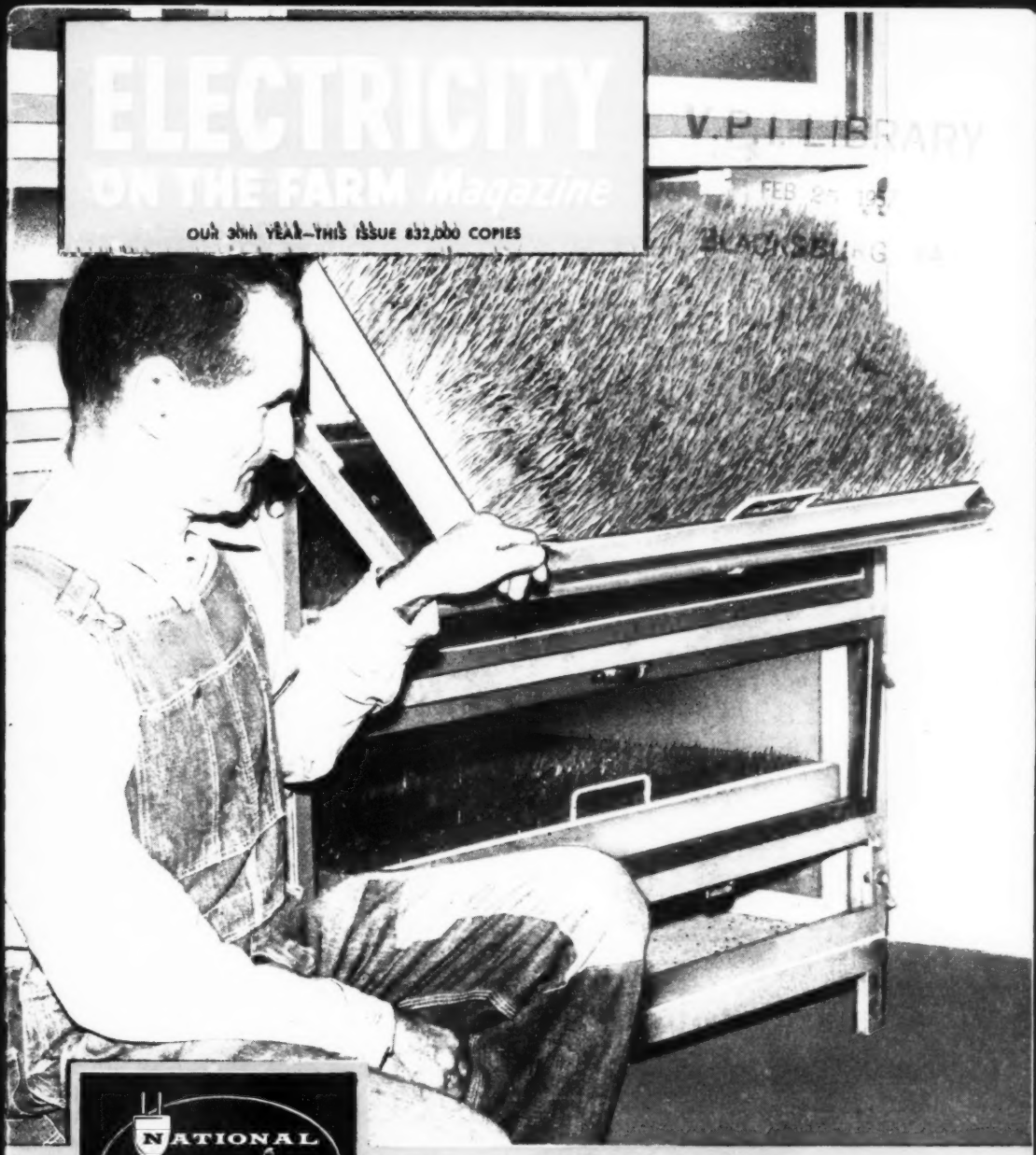


NATIONAL ELECTRICAL Week
FEB. 10-16, 1957

GROW GRASS INDOORS. It's the latest thing in dairy feeding. This new "Grassmaker" grows green, luscious forage in only six days. Here John W. Cessna of Rainsburg, Pa., inspects a trayful which is ready for feeding. For further details, see page 16.

Do it With Infrared Heat Lamps ..... Page 8

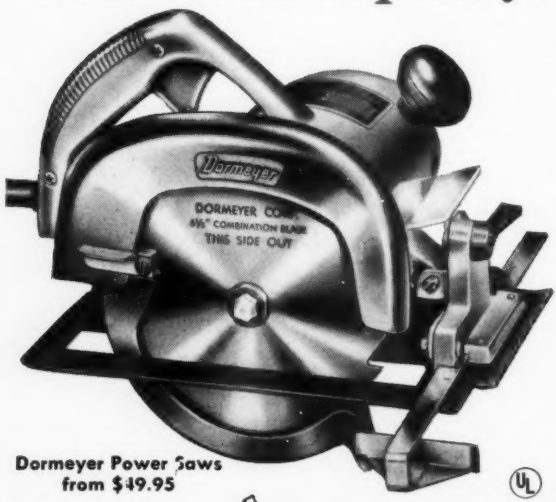
How to Solve Your Motor Wiring Problems ..... Page 12

Washdays! Now a Thing of the Past ..... Page 22

FEBRUARY 1957

H. J. McLaughlin, Valley Drive, Manhattan, Kansas, says...

"With my new Dormeyer Power Saw I do more repair jobs in less time"



Dormeyer Power Saws from $49.95

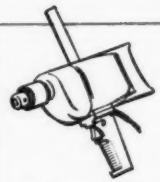
IT'S MORE POWERFUL... EASIER TO WORK WITH ...AND A LOT SAFER, TOO

Once you get the "feel" of this new Dormeyer Power Saw...you'll say instantly—PERFECT BALANCE! Permits one-hand operation... leaves other hand free. You can use it for longer periods with less fatigue!

Exclusive eye shield protects eyes against flying chips ... and the cutting line is always visible from your natural operating position—either left or right side. For greater safety, blade guard retracts automatically on entering work. Instant fingertip adjustments for bevel and depth cuts. Rip guide, and many other features.

For performance ... quality ... and economy ... more farmers prefer the Dormeyer. See it soon at your local hardware or farm equipment dealer.

¼" Power Drills

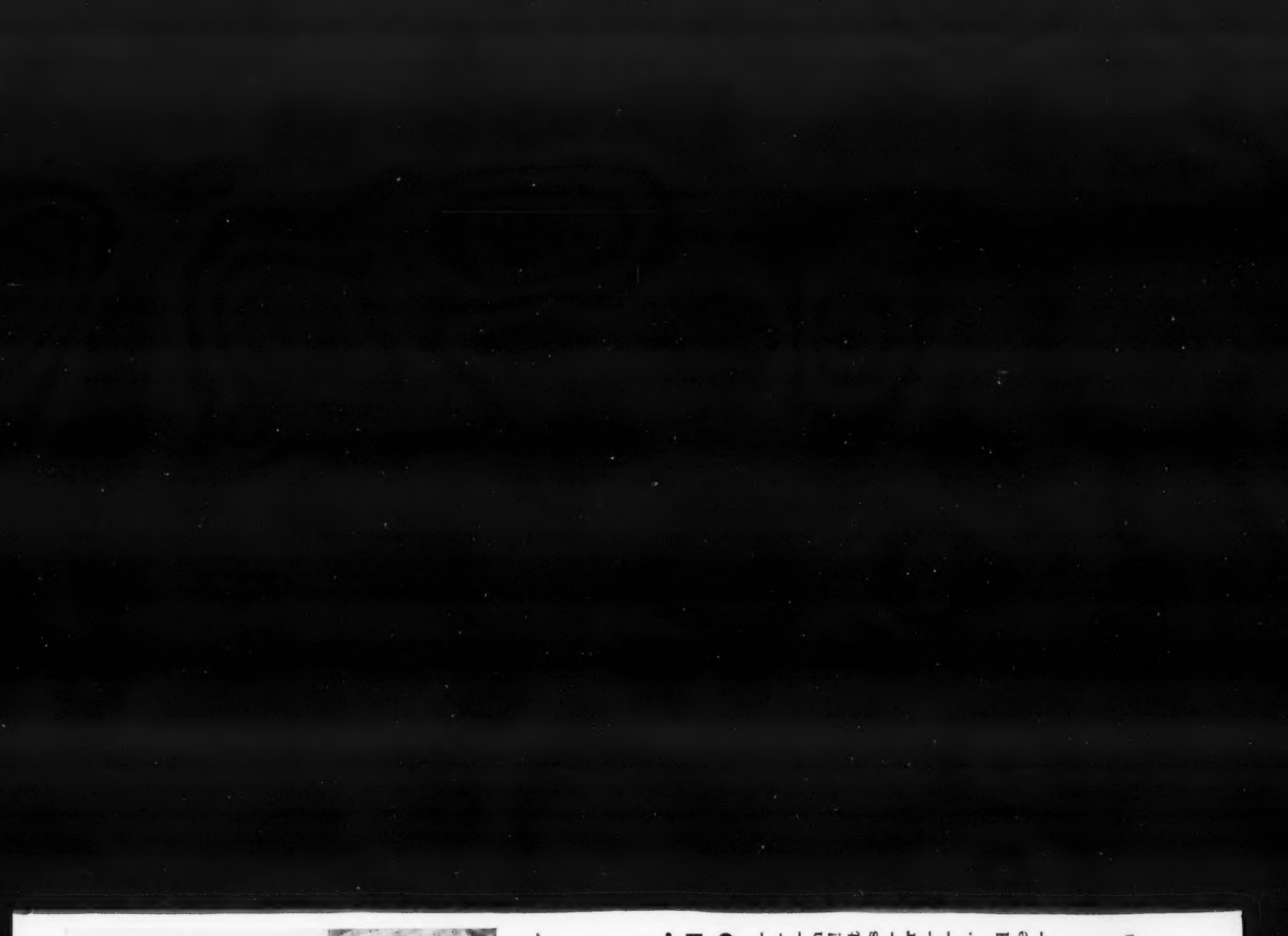


½" Power Drills

Power Sander

DORMEYER

POWER TOOL DIVISION
Chicago 10, Illinois



Editor's Chat

ELECTRICAL WEEK

Sit back for a minute and try to imagine what farming would be like today without electricity. Suppose, all of a sudden, there were no electric lights, no radio or television, or no automatic water systems. And where would we be without electrical energy available to put life into all the electric motors that operate our materials handling equipment or storage facilities? We would all have to agree that farming along with practically every other pursuit would be very impractical and close to impossible. Just now and then we are reminded of the predicament we would be in without electricity when the power goes off momentarily.

Electrical energy consumption on farms is increasing by 8-10% every year. But most of us haven't been conscious of this tremendous increase since our bills do not reflect it in direct proportion. Why? It's because electricity is one of the few things we buy that has decreased steadily in price through the years.

The record of progress in the electrical industry that has made possible a continuing decrease in price and the availability of modern equipment that uses electricity efficiently are two primary reasons for National Electrical Week. This observance is scheduled annually for the week of February 11th, birthday of Thomas Alva Edison. For 1957, National Electrical Week is February 10-16. This week was chosen because of Edison's important role in the electrical industry.

It was 77 years ago that Edison invented the first practical incandescent lamp. He also developed means of generating and distributing electricity on a mass scale.

ON A HOT SPOT

It is quite likely that some of you have come in from the lot or back from town and found the woman of the house in a twitter, or a long line of cows restless because something has interfered with the normal and expected water supply. This usually occurs when there are a lot of chores to do or other more important and pressing matters than tinkering with the water works. Although a practiced diplomat (such as most husbands become) may pacify and stall off the little woman, there is no use arguing with a cow when she's bellowing from thirst. You just have to deliver!

If and when this interruption of water is caused by freezing, and if that trouble is chronic, then an electric "hot-spot" in the form of heating cable or heat lamps is probably the best way out. It may, and usually can, either get you off this particular "hot-spot" or prevent the trouble entirely. If you want peace in the home and production in the dairy, and frozen pipes is a problem, look into the possibility of using heating cable or lamps.

GRAVITY

There's an old saying, "Whatever goes up, has to come down". End of quotation, but not the end of the problem of getting silage up into a silo and then getting it down again. With blowers and elevators we have largely overcome the problem of getting silage UP. But it's that twice a day chore of going up into the silo and throwing down the stuff that becomes a continuing nuisance.

Besides the work, especially when silage is frozen, there is considerable hazard in going up and down. And no one nowadays can afford an accident. Both the work and hazard can be eliminated with a silo unloader.

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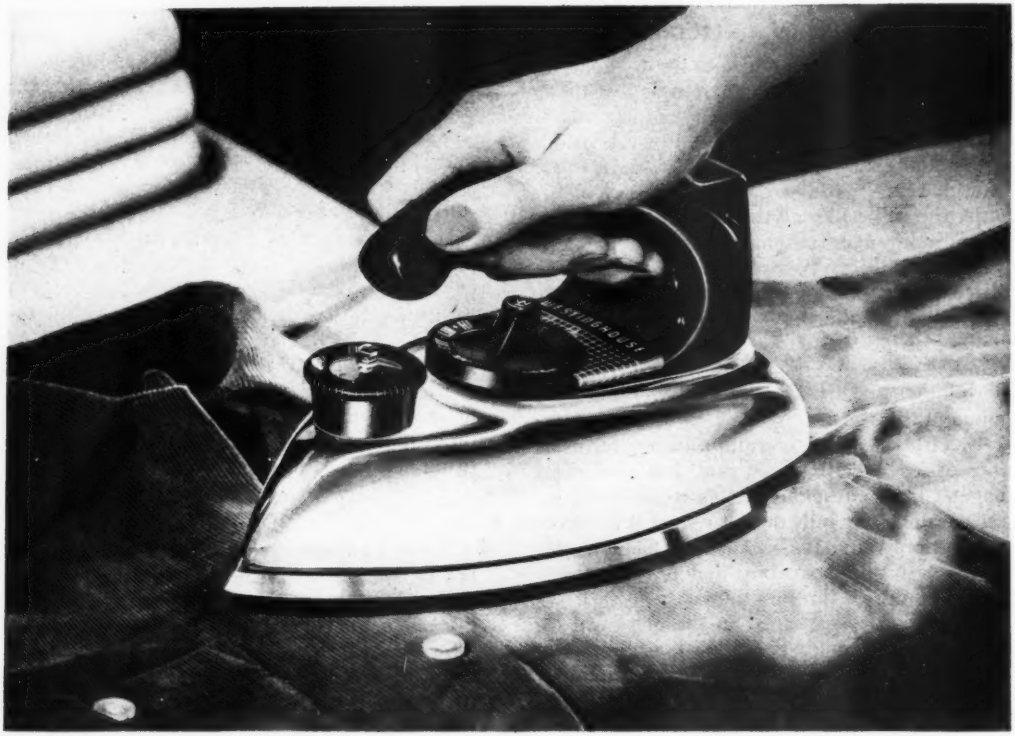
Special design lets you iron more with each stroke



Westinghouse Steam-N-Dry Iron

FIFTEEN SPECIALLY PLACED STEAM VENTS give you more moist, penetrating steam over a wider path . . . you iron more with each stroke!

EXCLUSIVE OPEN HANDLE DESIGN ends wrist strain, keeps fingers and hand relaxed. You can iron into pockets, stitched pleats, sleeves.

DOES ALL YOUR IRONING . . . steam or dry. Uses ordinary tap water. Glamorous antique Coppertone finish, $18.95; Deluxe chrome, $16.95.

Tip for ironing corduroy: Westinghouse steam-iron it first on the wrong side, then brush it on the right side. Finish it off by holding your steaming Westinghouse ½ inch above the right side to bring up the nap.

LIMITED TIME SPECIAL OFFER! **$3.00 TRADE-IN** UNTIL MARCH 15 ON ANY NEW WESTINGHOUSE OPEN-HANDLE IRON

YOU CAN BE SURE...IF IT'S Westinghouse

BEFORE—Keeping the milkhouse comfortable involved hauling coal, removing ashes, and constant stoking and attention to maintain satisfactory temperatures during winter weather.

AFTER—This small 1500-watt space heater automatically keeps milkhouse at desired temperature. Aside from eliminating a very tedious fire-tending chore, it requires much less space.

Doing It Automatically Saves Time and Money

Heating milkhouse electrically solved a tedious fire-tending problem

By **BRUCE FEARN**

R J. Bennett of Doylestown, Penna., heated his milkhouse with a coal brooder stove for many years. It did the job. The milkhouse on even the coldest days could be made comfortably warm.

Of course, it was not just as easy as that. There was coal to be carried. There were ashes to be removed. Sometimes the coal stove would go out. Quite often the milkhouse got too hot. Sometimes it was hot when it should have been cool and cold when it should have been hot.

Then there was the cost involved. The coal stove used about 100 lbs. of coal a week just to keep it burning. Bennett was paying up to $20.00 per ton for coal delivered to his farm. This made the coal bill run about $1.00 per week or $4.25 per month. Over and above this cost was the labor for carrying coal, stoking and hauling ashes.

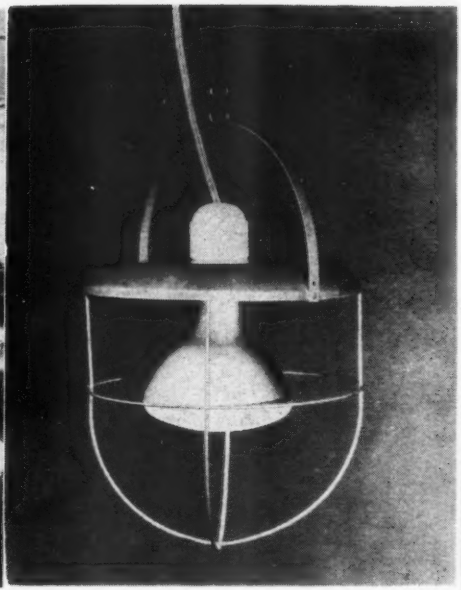
Bennett got to thinking about all these things and one day talked to his equipment dealer about it. His dealer suggested electricity for milkhouse heating adding that such modern heating was enjoying widespread acceptance.

Further investigation revealed that a complete line of electric milkhouse heaters were available to suit just about any need. Also, the prices for quality equipment were surprisingly low. Bennett selected a 1500-watt unit to fill his needs. The unit came equipped with a thermostatic control as well as a manual control. Installation was easy because it was a 115-volt device and only required a well-wired convenience outlet.

Bennett turns the heater on manually an hour in the morning and an hour in the evening to heat the milkhouse at milking time. Overnight and between milkings the heater is controlled thermostatically at 35°. This prevents freezing and yet keeps the milkhouse at a low temperature which cuts down on the milk cooling costs, since the cooler operates more efficiently in a cool area.

Bennett figures the operating cost of his electric space heater compares favorably with the old coal heater. The big pay off is in time saved, greater cleanliness, added safety, and more efficient milk cooler operation. This last item is, of course, reflected in lower power consumption for this operation. □ □

One or more heat lamps hung or mounted overhead will provide that bit of "spot heat" needed for comfortable working at the many stand-up jobs necessary around the farm. Here three 250-watt clear glass lamps furnish both heat and light.



Always use heat lamps in porcelain sockets, suspended by a chain. A shielded fixture or curved guard is desirable to prevent lamp breakage and to turn the lamp upward if it falls on litter.

Do It With Infrared Lamps

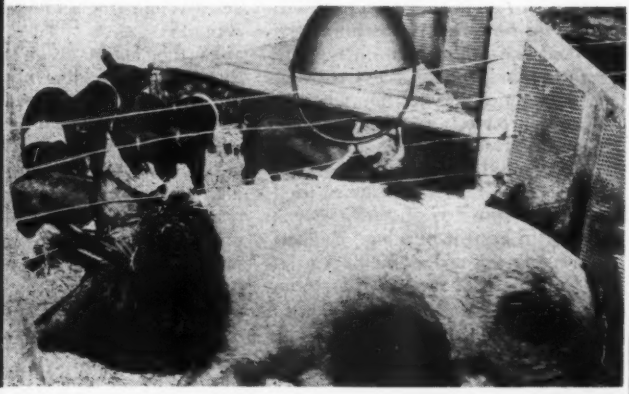
By ERVIN BAKER

Infrared heat is one of the most widely accepted heat sources for farm and home. The most popular way to produce this heat is by lamps. These fall into two general categories. The mushroom shaped lamp (R40) is the more familiar. The PS30 infrared lamp, a more recent development, is shaped like a regular light bulb.

The R40 lamp is available in 125-watt, 250-watt and 375-watt sizes. The 250-watt lamp is the most popular for farm uses. Heat lamps may be obtained in either clear or red colored thermoshock-resistant type glass (Pyrex) for use where breakage by moisture may occur.

The same amount of infrared is produced by lamps of equal wattages but transmission of infrared through the

Livestock are commonly brooded with a single lamp. It will quickly dry off a new born lamb or calf and keep it warm and comfortable during critical hours right after birth. For pigs, mount lamp over area where mother sow is restricted to keep pigs from being trampled.



Single lamps in portable, clamp-on holders can be used for temporary heating jobs as thawing pipes, drying paint, defrosting frozen food, warming engines or melting grease in clogged kitchen sinks.

Single or multi-lamp fixtures are used for poultry. Each 250-watt lamp handles 60-100 chicks. Mount lamps 18 inches above litter for small chicks. Raise 2 inches per week up to 26 or 28 inches. Use corrugated paper guard to confine chicks and reduce drafts.

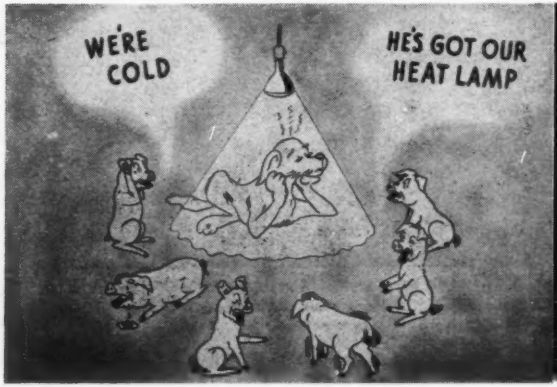
glass may be affected by the degree of frosting or coloring of the glass. The pattern of distribution which affects the concentration of heat energy is changed by the shape of the bulb and the amount of frosting on the glass.

The red lens lamp is the only R40 lamp which does not have any frosting on the glass. Consequently, the amount of infrared produced is distributed over the smallest area of any of the infrared lamps, resulting in the highest concentration. The so-called "white" or "clear" lamps do have a light frost on the glass and distribute energy over a larger area than the red lens lamp. The heavily frosted "brooder lamp" has a considerably wider pattern of distribution.

The PS30 infrared lamp distributes infrared energy over from four to six times the area of the R40 lamp when mounted at the same height. Therefore, this lamp can be mounted lower than the conventional R40 without getting a "hot spot" when brooding young chicks. When used in multi-lamp fixtures, PS30 lamps should be mounted approximately parallel in order that overlapping patterns will produce the desired concentration of heat.

With the proper selection and application of infrared equipment, numerous tasks around the farm can be done quickly, easily and economically. Practically any heating application where it is not feasible to heat surrounding air is adaptable for infrared heating. □ □

An Indiana farmer heard pigs squeeling one night and upon investigating found that his Collie had chased the pigs away from the lamp and was utilizing it for his personal comfort. Smart Collie!



Even a dog's life is happier and more pleasant under the warm, soothing rays of a heat lamp. And the installation is very easily and quickly made, regardless of doghouse size or shape.

Chester Troyer, seasoned Hoosier corn grower says—

"Mechanization Reduced My Labor Force from 7 to 2 Men!"

By **JAMES R. EVERHART**

To most farmers the story of hybrid seed corn is an old, old story, much used and taken for granted today. Yet, to those who have pioneered and remained in the hybrid seed corn business it continues to be a challenging and interesting story of human endeavor.

Approaching threescore and ten years and with forty-eight years of experience in the production of seed corn, Chester Troyer of LaFontaine, Indiana, is just such a pioneer. Troyer started in the business of producing seed corn in the year 1907 when open pollinated corn was still the basis of all commercial corn production. With the advent of hybrid seed corn Troyer saw its future potential and began developing hybrids for his own business. In 1926 he sold his first hybrid seed corn, making him one of the first to develop, produce, and sell hybrid seed corn.

His production of hybrid seed corn has steadily increased each year until recently when he stabilized his acreage to about 600 acres. This acreage yields annually 20,000 to 25,000 bushels of marketable hybrid seed corn. At this level of production Troyer feels that he can remain efficient and still retain a personal hand in the development, production, and selling of hybrid seed corn plus better customer relations.

Troyer has always been a great believer in the advantages of using mechanization. Electric power and electrical equipment has had a definite part in the success of his hybrid seed corn business since he first acquired electric service on his farm over 20 years ago.

A new completely mechanized and electrified corn processing building was erected in the spring of 1952. This building coupled with a second existing tile block building houses all the facilities for processing hybrid seed corn from the field to the bag. It is 40 feet by 108 feet with five bins, each 12 feet square and 12 feet deep, located on both sides of a 4 foot by 6 foot air duct. This gives a complete working and walking area around the inside perimeter of the building.

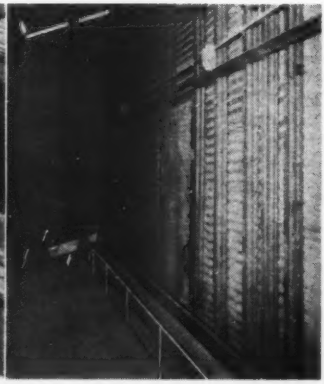
Complete electrification of this processing unit requires a cumu-

HERE'S HOW HE DID IT—

Mechanical unloading . . . automatic binning . . . gravity dumping

Wagon hoist dumps corn onto the 50 ft elevator which carries it up to horizontal conveyor above drying bins.

Horizontal conveyor dumps 30-35% moisture corn into any desired bin for drying by heated forced air dryer.



Sloped bottom bins lined with metal are easily emptied by gravity onto 10-inch endless belt conveyor.

lative total of over 75 hp in motors ranging from ¼ to 15 hp. The farm annual electrical consumption is more than 50,000 KWHr with 80% of this used in the seed corn business.

How Corn Moves Through Plant

Let us follow the route of the hybrid seed corn to observe how completely Troyer has mechanized and electrified the processing end of his business.

Corn harvesting begins in the fall when the moisture content of the corn reaches 30 to 35%. The ear corn is brought in by wagon or truck to the new building. Here, a hoist empties the corn from the wagon or truck into a 50 foot portable type elevator which has been placed in a stationary position. The ear corn moves up this elevator and drops into a horizontal chain conveyor which is located over the air duct and above the bins. From this conveyor the ear corn is dropped into the desired drying bin through a chute.

At an eight foot depth each bin holds 600 bushels of ear corn which is the usual loading capacity, although it may be more, if necessary. The ear corn is dried with an oil fired heated air drier capable of drying four or five bins at one time, depending upon the depth of the ear corn and the moisture content.

Since the corn is to be used for seed, accurate temperature control must be maintained. All drying is done at 110°F. Two thermostats one at the drier and one in the hot air duct, control temperatures. This insures that drying temperatures do not exceed 120°F. which would damage germinating ability. Moisture content is reduced to 12% or less for seed corn that is to be sold and 7 to 8% for the foundation stock.

After the ear corn has been dried to the required moisture level, it is very easily emptied from the sloping bin floor into a 10-inch endless belt conveyor. This is located in front of the bin doors and extends the full length of the bin area. It moves the ear corn to the opposite end of the building.

Here the ear corn drops into a small elevator which moves it up to the sheller. A cob blower removes the cobs from the building as the corn is shelled. The shelled corn is picked up by a bucket elevator and elevated up 24 feet to the top of the building.

From here the shelled corn leaves the new building and flows by gravity through a 4 inch tube to a second building for further processing. As it enters the building, it is elevated to a seed corn cleaner. After cleaning, it is moved to the top of this building by another bucket elevator.

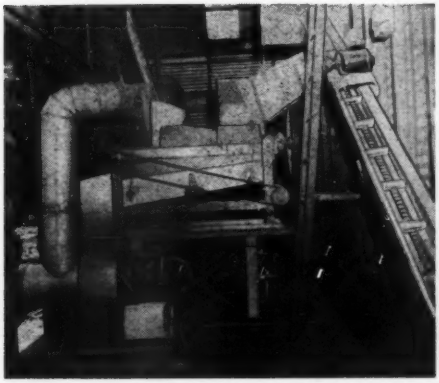
The corn then passes through a series of three graders on the third and second floors. These units sort the kernels on the basis of thickness, width, and length. After sorting, the seed is dusted with a fungicide and binned. From the bin, it goes to the first floor to be weighed, bagged and stored for spring market.

Uses Refrigerated Storage

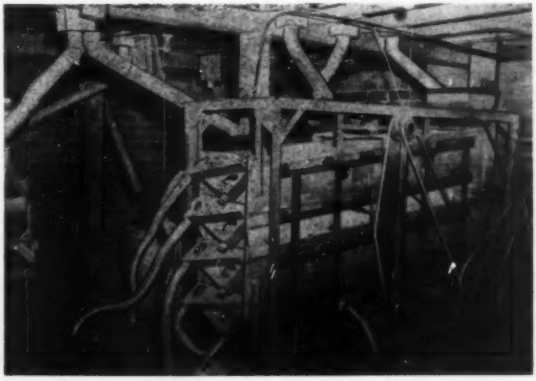
A wing of the building also contains a special 15 foot by 30 foot refrigerated room. Here 1200 bushels of foundation seed corn are held at a temperature of 40° to 55°F. and a relative humidity of 50 percent. This assures that the foundation stock will retain its high quality.

During the peak of the season 800 to 1000 bushels of corn can be dried and processed a day. Troyer says, "I have been able to reduce my permanent year-round payroll from seven to two men through a complete mechanization and electrification of my seed corn processing units." □ □

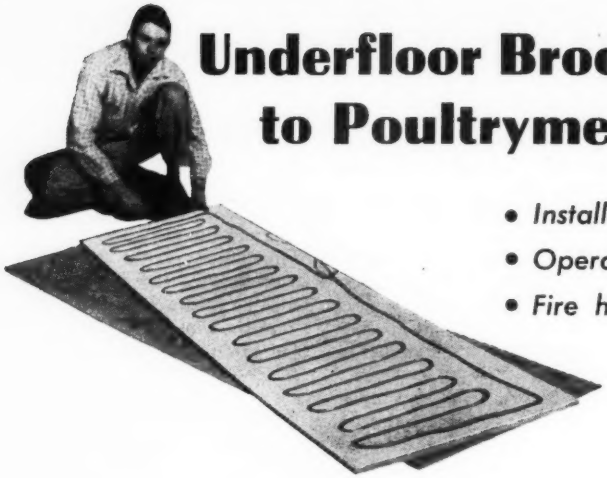
. . . shovelless shelling . . . *controlled grading . . .*



Conveyors are used to feed the 500-bushel per hour sheller and to remove the shelled corn. Blower carries cobs away.



Shelled corn is graded as to kernel thickness, width and length by this machine. After grading, the seed is dusted with fungicide and stored until market time.



Underfloor Brooding Appeals to Poultrymen Because . . .

- *Installation is simple*
- *Operation is economical*
- *Fire hazards are eliminated*

More and more emphasis is being placed on efficiency in modern day poultry raising. This is especially true of brooding.

A new type of brooding called underheat poultry brooding has become quite widely accepted in many parts of the country recently. One of the chief reasons poultrymen are turning to this type of brooder is because of its low cost. Poultrymen have been able to purchase all necessary materials for a 1000-chick brooder for only $35. Operating cost is also very low. Most installations average less than ½ KWHr to brood each chick.

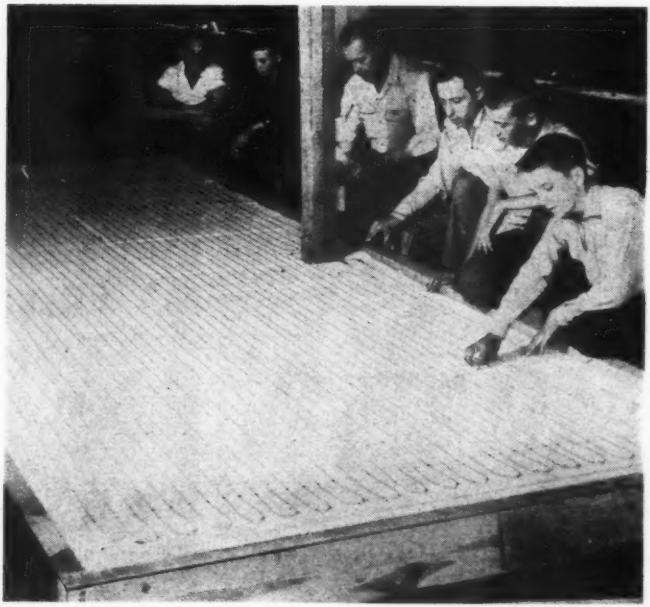
Underheat poultry brooders use heating cable for a heat source. The heat is applied under the chicks, thus allowing them to benefit from heat transferred by conduction, convection and radiation.

Advantages of Underfloor Brooding

Underheat brooders can be built by anyone handy with carpenter tools. The size and shape can be varied to fit almost any house with flocks of 500 or more chicks.

Several other definite advantages to this type of brooding are:

- Elimination of fire hazards
- Fully automatic, thermostatically controlled heat
- Cold room brooding possible
- Dry brooder house since there is no combustion with resultant release of moisture
- No labor required to handle fuel or ashes



Above: Portable underheat brooders are simple to construct. Cable is fastened to insulating board. Wood strips next encase a ¾ inch layer of sand and the plywood top is fastened to the strips.

Right: H. J. Pirkle of Ranburne, Alabama, received help from local Vo-Ag senior class in installing this slab underheat brooder. Pirkle used plan shown on next page and built entire brooder in one operation.

- Easy to clean since heat underfloor quickly dries droppings
- Economical to operate as compared to other brooding methods
- Warm concrete or sand holds heat for several hours should electric service be interrupted

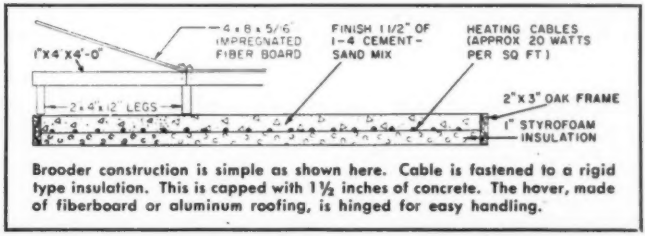
Designs are Based on Louisiana State University Research

Underheat brooders fall into three general classes. These are: portable, semi-portable, and permanent. The portable unit or "heat sandwich" as it is sometimes referred to is a development resulting from research work done by Louisiana State University. It is preferred by many growers because of the portability feature. This makes it easy to remove for cleaning pens and to store between brooding periods. This unit is made by placing heating cable inside a layer of sand sandwiched between an insulating material underneath and a top of some suitable material such as fiberboard.

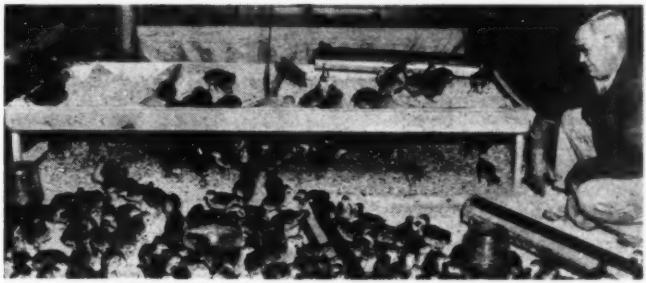
The semi-portable units are made in a similar manner to the portable but are larger and more cumbersome to move. The permanent units are either built as part of the concrete floor or as concrete slabs with the cable placed near the surface. It is very important to have proper insulation underneath the cable in order to prevent heat from being lost downward. This often presents somewhat of a problem on the large, permanent slabs.

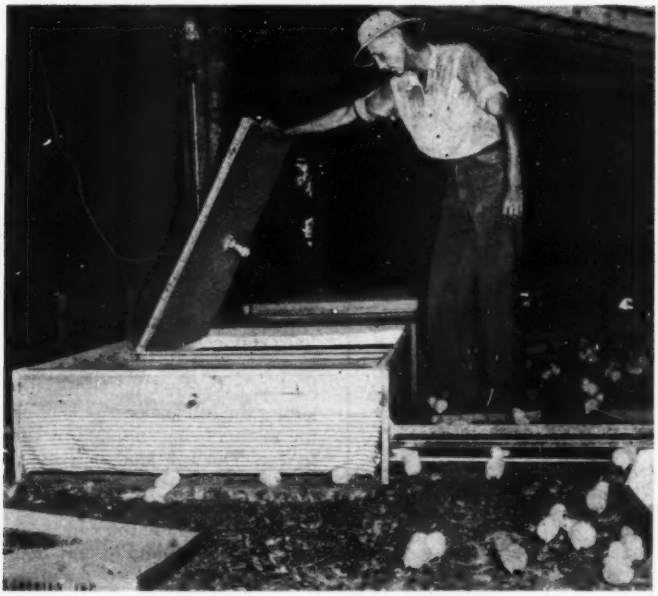
Between 20 and 25 watts of heating cable should be used per square foot of brooder area. The design should provide from .08 to .10 square foot of brooding space per chick.

Hovers are used above the brooders to reflect the radiant heat back to the chicks for re-use. The hover should be placed one foot above the brooding slab surface. The homemade hover can be made from fiberboard, plywood, sheet metal, or other suitable material. It should be painted on the underside with aluminum paint. A 7½ watt bulb, placed in the center of each hover, serves as an attraction light. □ □


4 x 8 x 5/16" IMPREGNATED FIBER BOARD
FINISH 1 1/2" OF 1-4 CEMENT-SAND MIX
HEATING CABLES (APPROX 20 WATTS PER SQ FT)
1"X4"X4'-0"
2"X4"X12" LEGS
2"X3" OAK FRAME
1" STYROFOAM INSULATION

Brooder construction is simple as shown here. Cable is fastened to a rigid type insulation. This is capped with 1½ inches of concrete. The hover, made of fiberboard or aluminum roofing, is hinged for easy handling.





▲E. J. Schmidt of Hot Springs, Arkansas, is a retired heating and ventilating engineer. He says commercial experience taught him that electric underheat would do the best job for his turkeys.

◀ Poultryman Roy Feazell of Gardner, Louisiana is very happy with his new underheat electric brooder. He built six 4 ft by 12 ft insulated concrete slabs to accommodate 4,000 chicks. Each slab has a thermostatically controlled 800-watt heating cable cast into concrete.

How to Solve Your Motor Wiring Problems—

By A. P. NICKLEY

Many labor-saving devices have come upon the scene to lighten the farmer's load in recent years, thanks to electricity. An integral part of most of these devices is the electric motor. As more motor driven apparatus is added to the farm, the problems of installation of the necessary wiring and control equipment become increasingly complex.

This article is not intended as an instruction on how to install wiring and control equipment. Rather, its primary purpose is to provide the farmer with a means of selecting the proper wire size for the load and length of run involved. It also helps him to plan not only for his immediate needs but for future needs by including in his calculations any anticipated loads. Size and type of insulators, service heads, service entrance cable, conduit, and other wiring apparatus selected should conform to the National Electrical Code specifications for safety. Also, the actual wiring installation should be done by a qualified electrician.

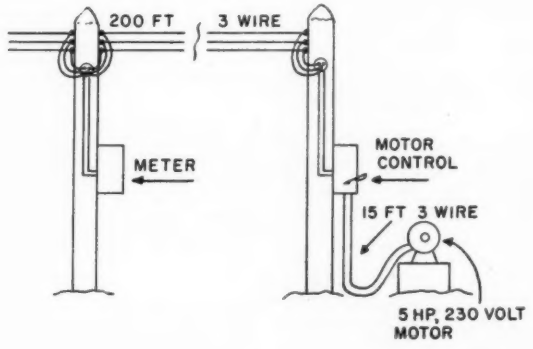
TABLE I—Wire Sizes for Outdoor Feeders

Line Amps 115 volts	HP†	Overhead Distance (Feet) 0-50	50-100	100-150	150-200	200-250	250-300	300-350
		Wire size (gauge) (Type WP)						
4.6	¼	10	10	10	10	10	10	10
7.4	½	10	10	10	10	10	8	8
10.2	¾	10	10	10	10	8	8	8
13.0	1	10	10	10	8	8	6	6
230 volts								
2.3	¼	10	10	10	10	10	10	10
3.7	½	10	10	10	10	10	10	10
5.1	¾	10	10	10	10	10	10	10
6.5	1	10	10	10	10	10	10	10
9.2	1½	10	10	10	10	10	8	8
12	2	10	10	10	10	8	8	6
17	3	10	10	10	8	8	6	6
28	5	10	10	8	6	6	4	4
40	7½	10	8	6	4	4	2	2
50	10	10	8	4	4	2	2	1

†*Amperages shown are approximate for the hp indicated.*

The above table is based on a 30 volt maximum drop during start from the service drop or meter pole to the motor or to the service entrance conductors of another building.

Note: Conductors in unsupported overhead spans greater than 50 feet should not be less than #8 wire.



Problem: *Determine wiring installation from meter pole (or service drop) to a remotely located motor as shown above.*

Solution: A 5 hp motor draws 28 amps full load. 28 x 1.25=35 amps. From table I, #4 wire is necessary for the overhead line. From table II, #10 wire should be used from the motor starter to the motor. This wire should be buried or in conduit.

Determination of Wire Size

The primary consideration in determining the wire size necessary for a feeder circuit is the total connected load in amperes to be carried by the wire. This load is calculated by adding together the full load currents of all the motors being supplied by the feeder. The full load current of the largest motor is multiplied by a service factor of 1.25. If two or more motors are the same size, the factor is applied to only one. The full load currents of the other

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TABLE II—Wire Sizes for Indoor Branch Circuits

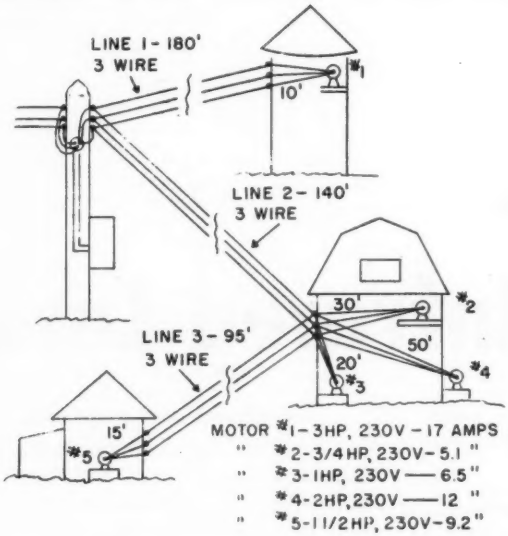
115 volts		Distance (Feet) from Service Entrance to Motor															
	HP*	0-20	30	40	50	60	70	80	100	120	140	160	200	240	280	320	360
		Wire Size (gauge) (Type R, RH, RW, RU, RUW)															
4.6	¼	14	14	14	14	14	14	14	12	12	10	10	10	8	8	8	6
7.4	½	14	14	14	12	12	10	10	10	8	8	8	6	6	4	4	4
10.2	¾	14	14	12	10	10	10	8	8	8	6	6	4	4	4	2	2
13	1	14	12	12	10	10	8	8	8	6	6	6	4	4	2	2	2
230 volts																	
2.3	¼	14	14	14	14	14	14	14	14	14	14	14	12	12	10	10	10
3.7	½	14	14	14	14	14	14	14	12	12	10	10	10	8	8	8	6
5.1	¾	14	14	14	14	14	14	12	12	10	10	10	8	8	6	6	6
6.5	1	14	14	14	14	12	12	12	10	10	8	8	8	6	6	6	4
9.2	1½	14	14	12	12	10	10	10	8	8	8	6	6	4	4	4	4
12	2	14	12	12	10	10	10	8	8	6	6	6	4	4	4	2	2
17	3	14	12	10	10	8	8	8	6	6	4	4	4	2	2	2	1
28	5	12	10	8	8	6	6	6	4	4	2	2	2	1	0	0	2/0
40	7½	10	8	6	6	4	4	4	2	2	2	1	0	2/0	2/0	3/0	3/0
50	10	8	6	6	4	4	4	2	2	1	1	0	2/0	3/0	3/0	4/0	4/0

Table based on a 10 volt maximum drop on starting
**Amperages shown are approximate for the hp indicated.*

motors are then added to this value to obtain the total load.

In feeder circuits which supply both motors and lighting or appliance loads, the wire size must have a capacity equal to the sum of the motor currents as determined above, plus the current required to operate the lights and appliances.

Table I is to be used in the selection of overhead feeders from a service drop, meter pole, or building to the service entrance conductors of an out building or to a motor pole for isolated motors. Table II should be used for wire in conduit or raceways, direct burial, and for internal wiring. This includes the service



Problem: *Determine proper wire sizes for various lines needed to serve motors shown.*

Solution: Line one from the meter pole to the silo must carry 17 x 1.25=21 amps 180 feet. From table I, this value of current falls between 17 and 28 amps. In cases such as this, it is wise to go to the higher value. Therefore, #6 wire is necessary for the overhead span. From table II, we find #12 wire is needed for the 10 ft. internal wiring of the silo.

Line two from the meter pole to the barn must have capacity to carry the total load of the barn plus the out building.

Motor	#2		*5.1 amps*
	#3		*6.5 amps*
	#4	*12 x 1.25*	*15.0 amps*
	#5		*9.2 amps*
			35.8 amps

Line two must carry 35.8 amps 140 feet. From table I, #6 wire is necessary. Inside the barn, the various wire sizes as taken from table II would be as follows:

Motor	#2	*#14 wire*
	#3	*#14 wire*
	#4	*#10 wire*

The above calculation falls in line with the method of determination of the wire size in problem one. A further look at problem two, however, will show the results to be very pessimistic as all the motors on the line were assumed to be running at the same time. In actual practice the line will rarely be called upon to carry the full load. Since this is true, it is common practice to use a value of 75-80% of the total computed amperes as the current load for selecting the wire size. With this in mind, we can rework the problem to a more logical solution as follows:

Motor	#2		*5.1 amps*
	#3		*6.5 amps*
	#4	*12 x 1.25*	*15.0 amps*
	#5		*9.2 amps*
	35.8 amps x .75		*=26.9 amps*

Line two must now carry 26.9 amps 140 ft. From table I, #8 wire is necessary. The internal wire size would be the same as previously indicated.

Line three must carry 9.2 x 1.25=11.5 amps 95 feet.

From table I, #10 wire is needed. No. 14 wire is needed for the 15 ft. run inside the building.

entrance conductors and special circuits to a motor or appliance or to a branch circuit panel from which other loads are taken for the same building.

Supply Voltage

Generally, electric power on the farm is single phase, 60 cycle, alternating current (A.C.), at 115 or 230 volts. With a three wire system, both 115 and 230 volts are available. Single phase motors usually are rated dual voltage, 115 and 230 volts. Motors are guaranteed to operate satisfactorily at a voltage variation of 10 per cent above and below rated voltage. This means that a motor may operate at a voltage of 207 volts on the 230 volt connection.

Therefore, line voltage down to a minimum of 207 volts at the motor is permissible and still enables proper operation. With this in mind, table I and table II were developed to limit the total line voltage drop of the overhead conductor plus the conduit or internal conductor to permissible limitations. It is therefore of great importance that the voltage be determined at the meter. If the electric power supply at this point is not 230 volts or perhaps higher, the power supplier should be contacted and arrangements made to have the voltage increased to the proper rating.

Motor Control

Any proper motor installation includes correct motor control equipment as well as the motor and the wiring carrying electric power to it. A correctly selected and applied control will do two things:

- It provides a means of starting and stopping the motor.
- It protects the motor against overloads.

The simplest form of motor control equipment is merely a switch that opens or closes all ungrounded wires of the circuit leading to the motor. More complex control units incorporate de-

(More on page 34)

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- Paddles welded, not bolted, to chain
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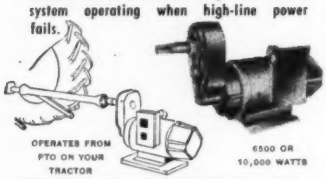

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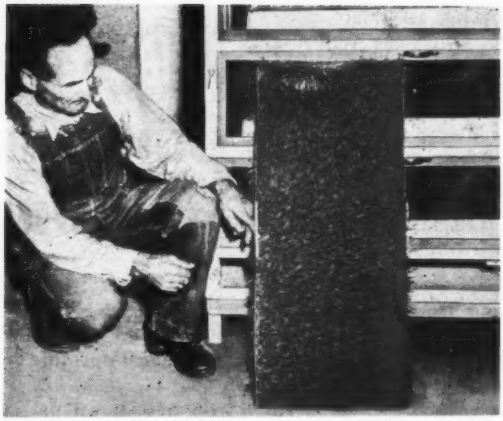


The grassmaker is a chest equipped with five 660-watt thermostatically controlled heaters to maintain proper temperatures for optimum growth. A blower circulates air throughout the cabinet. This 60-basket model will produce 1200 to 2100 pounds of forage in six days from 270 to 300 pounds of cereal seeds.

Growing Grass Indoors—

May not replace the pasture but will certainly supplement our livestock forage supplies

The newest thing in dairy feeding is growing grass in a file cabinet during winter months! Strange as this may sound, there is now a unit on the market that does just that. And it is all done without soil in the short period of six days. Actually, it is a practical application of hydroponics. Hydroponics is the cultivation of plants by placing the roots in liquid nutrient solutions rather than in soil.

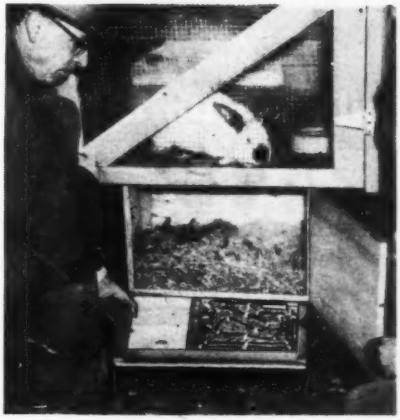
This new forage growing machine uses common cereal grains as barley, rye, oats, corn and maize. With the aid of water, chemicals, and heat, the cereal grains are sprouted. At the end of the sixth day the entire growth, roots and all, is fed to dairy cows. The material can also be used to feed pigs, turkeys, or chickens.

Seeds are presoaked to start germination before they are put into the machine. They are then put into perforated trays which are placed in this cabinet. Water mixed with a chemical containing trace minerals and plant nutrients drips down through the cabinet and is absorbed by the forage plant seeds. An electric heating system, thermostatically controlled, keeps the cabinet at the proper uniform temperature. Humidity is maintained at 85%.

The machine is capable of producing green forage winter and summer for an average cost of $20 per ton, excluding cost of the machine itself. Farmers who are using it report that when cows are fed this type of green forage during winter months, both the amount of milk and the butterfat content are increased up to 10% or more.

The machine is just being introduced in this country. It was developed about 10 years ago in Belgium. Since then it has been used extensively there and in other European countries. □ □

This Farmer Saves Cold Weather Babies



A three foot, 15-watt thermostatically controlled heating cable is attached to the under side of the nesting box. Aluminum foil deflects heat directly upward into rabbit doe's nest. Heat is used two days prior and one day following birth of the baby rabbits.

Rabbit raising is rapidly becoming a sizable industry in some areas of our country. A major problem encountered by rabbit raisers is that of brooding the litter safely during cold weather. The average litter numbers about eight. When these are born during extremely cold weather, it is not unusual for all of them to freeze to death.

Clarence Stevens of Holden, Massachusetts, who raises about 1000 rabbits annually, has come up with a solution to this problem. He has devised a detachable brooder which fits on the bottom side of his underneath nesting boxes. The brooder is made by fastening a 3 foot, 15 watt heating cable and a thermostat to a wooden frame or base. This frame is attached to the bottom of the nesting box with springs. A piece of aluminum foil is placed under the cable to reflect the heat upward. The thermostat is set to turn the heat on when temperatures drop to just above freezing. The big advantage of this brooder is that it applies the heat to the bottom of the nesting box.

Stevens has used this method for brooding rabbits during three winters without a mortality. Each unit costs him $7.00 for material and a half hour's time to assemble. The small investment pays because as he says, "If I lose a whole brood, I have to feed and care for the doe for another month. This costs 40 to 50 cents for feed alone."

ARTHUR G. FOX

Century **Farm-Tested** Repulsion Start Induction **MOTORS**

start heavy loads with lowest starting current

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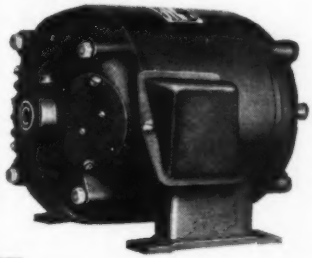

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Telescoping adjustments allow use of Patz Unloader in second and third silos of varying diameters . . . without purchasing extra parts.

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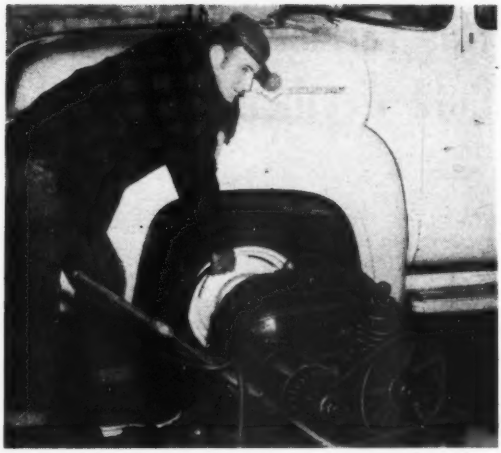

This ¼ hp air compressor furnishes ample requirements for the average farm. It inflates tires, sprays paint or supplies pressure for a jet-type air cleaner attachment used to remove dirt and dust from hard-to-get-at places on machinery or in buildings.

Have Compressed Air When You Need It

Did you ever need to add air to the tractor tire, do a painting job with compressed air, or have need for an air cleaner? If you have, maybe the equipment for these jobs is lying around your farm, just waiting for you to assemble it. Richard E. Clark of Pittsfield, N. H., who operates a 3000-layer poultry farm, found nearly all the parts for his air compressor right on the farm. He assembled the entire unit in his farm shop.

There was an old, unused refrigerator standing in one corner of his well-equipped shop. From this he removed the compressor, ¼ hp motor, pulleys and the frame on which they were mounted.

To make a handle, he welded on a U-shaped frame made of ¾" secondhand water pipe. The rear wheels came from a child's cart which had seen better days. The front pivot wheel is mounted in a U-iron frame which is attached to a bracket by means of a bolt.

The air tank is a war-surplus oxygen tank, about 5 gals. in size, which came equipped with a pressure gauge. However, Clark says that any well-constructed tank will do the job. He did have to obtain a length of air hose to complete his air compressor. Now he can easily maintain correct air pressure in all his vehicle tires, do paint spraying, and have an air cleaner handy for use in his shop.

W. A. BODWELL

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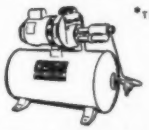

Rapidayton jet pumps have vertical or horizontal tanks

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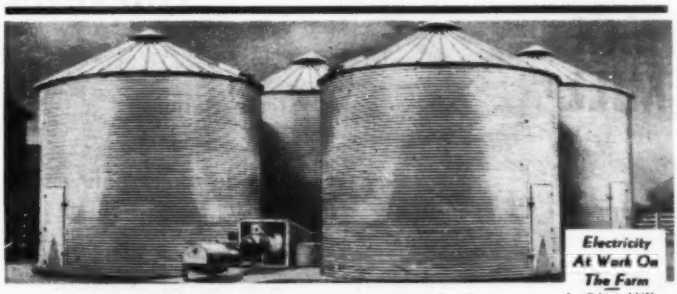

Electricity At Work On The Farm

L. Dice Miller, Lewisburg, Pa.

"I made 72¢ more per bushel

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Last year ('55), at harvest time, the best I could get for my corn, was a $1.00 per bushel.

So, after I dried my corn in my New Martin Drying Bins, I decided to leave it right in the bins for storage.

In June of '56 I sold my corn - for $1.72½ per bushel - thanks to Martin Harvest Hoarder Bins.

I'm adding another Martin Bin this year.' *L. Dice Miller, Lewisburg, Pa.*

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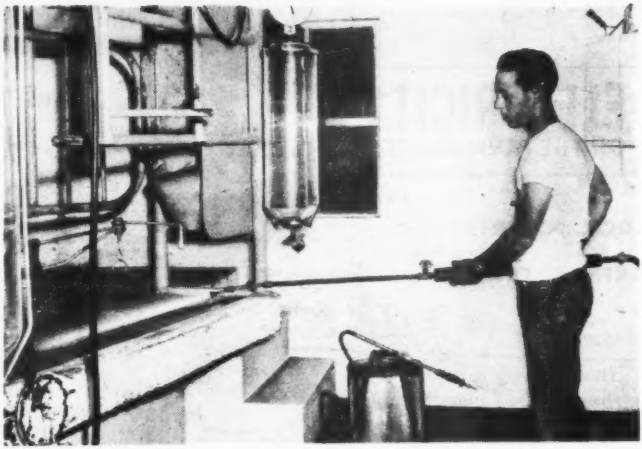


Steam under 90 pounds pressure does a thorough job of cleaning milk parlor stalls

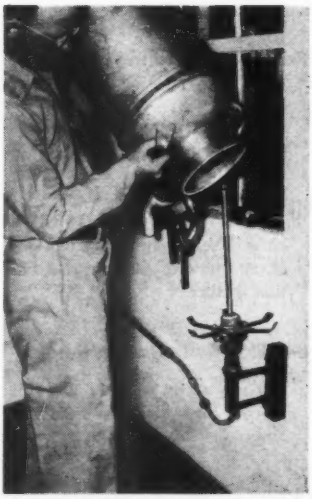
Kyle McGrady says:

"My Objective Is A Top Grade-A Dairy"

Steam cleaning helps attain "Grade-A" cleanliness and sanitation.

By **R. HAROLD ANDERSON**

Life has held its share of adventure for Kyle McGrady, Colfax, Wash. Today, McGrady operates a modern dairy in the Palouse farming region of the state. In sharp contrast to this quiet life, McGrady once was widely publicized as one of the earliest of the river boatmen who carried supplies up the wild waters of Hell's Canyon in the Snake river in Idaho.



McGrady built this revolving rack for easy steam cleaning of milk cans. Steam nozzle couples onto the bottom of the rack and a slender pipe carries steam well up into the can. Rack permits cans to be rotated for complete sterilization.

"I piloted the supply boat up the Snake for over twenty years," McGrady explains. "To me, it was just a routine job with just a few more hazards than other jobs might entail.

"Then an editor from a national magazine took some pictures and wrote an article about the way we took our boat through the rapids of the Snake. I found myself something of a celebrity. But my eyes began to go bad, so I turned to farming. Now my only objective is to build a top Grade-A dairy."

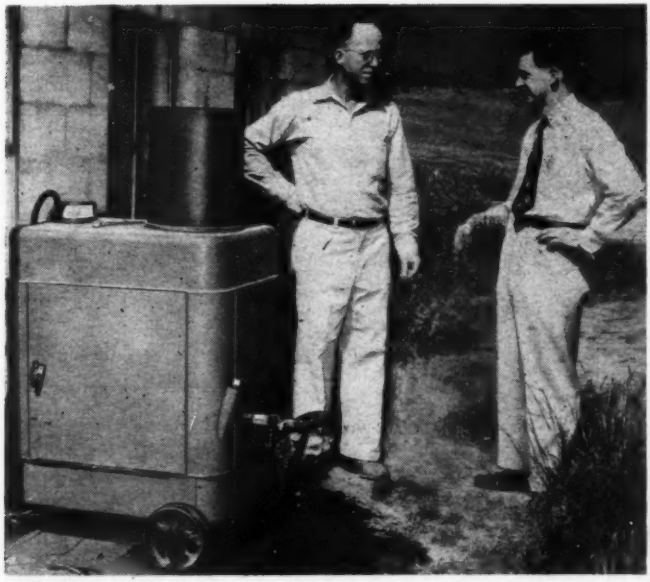
To his dairy farm, McGrady has brought some excellent methods for producing top quality milk. Among them is the steam cleaning of stalls and milk cans which he finds improves the degree of sanitation sought by every dairyman in order to keep bacteria counts in milk low.

The high pressure steam machine used by McGrady stands just outside the four stall pipeline milking parlor on his dairy. The steam, under 90 pounds of pressure, is piped inside to be used both in cleaning the stalls and the cans. Applied through a long handled nozzle common to steam cleaning operations, it does a quick and thoroughly efficient job of cleaning the parlor after milking time. It uses about two gallons of water per minute.

Devised Can Sterilizer

For cleaning his milk cans, McGrady devised a system of which he is particularly proud. Four short arms form a revolving rack upon which the upended milk can is placed. The long handled nozzle is attached by a special coupling to the bottom of the rack, and a length of pipe extended up the center allows jets of steam to be forced throughout the interior of the can. The revolving rack permits him to move the can so that every surface is sterilized by steam in a matter of a few seconds.

"I'm a real enthusiast about pressure steam in the dairy," McGrady says. "It is completely trouble-free, yet saves a lot of time and work." □ □



The steam generator is located just outside the milking parlor. Steam is piped into the parlor for use where needed.

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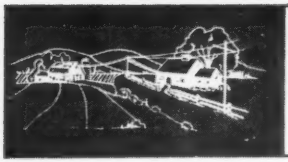


Electricity in
THE FARM HOME
EDITED By ELINOR CASAVECCHIA

Washdays! A Thing of the Past

Modern laundry equipment eliminates dawn till dusk washdays

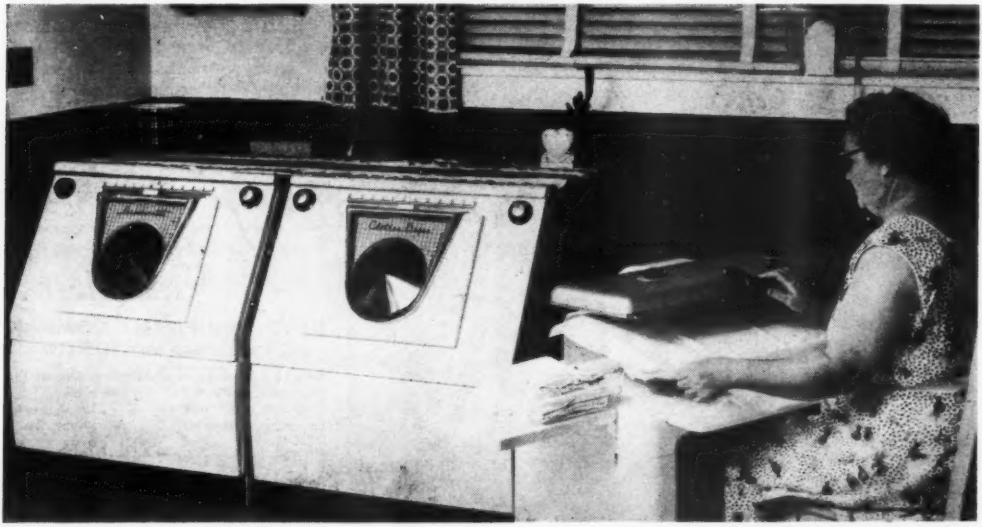
By **ELIZABETH WILSON**

It is truly a heart-warming experience to visit with a farm homemaker who is bubbling over with enthusiasm for the life she lives and the things that she and the rest of her family have accomplished over the years.

Mrs. Elmer Harris was particularly anxious to talk of the many advantages of her modern laundry equipment. Sixteen years ago the Harris family moved to a new farm home between Painted Post and Addison, New York. During the first few years at the new home, life for Mrs. Harris was not easy. She did all of the work for a family of four in a house without electricity. She struggled with a wood stove in a small kitchen which provided heat; not enough in the winter, too much in summer. On washday, water for doing the laundry, which consisted of stacks of heavy work clothes for the men of the family, had to be heated on the stove. Drying clothes was uncertain and dependent upon the temperamental Southern New York State weather. Ironing was a day-long task when irons were heated on the wood stove.

Over the years the dairy farm has been expanded. The Harris' now own 582 acres. The house has been remodelled, enlarged and wired electrically to give enough power to operate all of the appliances that make housekeeping so much easier.

When the kitchen was enlarged, it was designed so that Mrs. Harris now has room to seat 20 men for a meal during harvest



Mrs. Elmer Harris' washbasket contents can be completely laundered and ironed within a few hours because of her automatic equipment. The washer gets clothes sparkling clean, into the dryer just until they're slightly damp, and finished up in short order on what Mrs. Harris considers her most valuable piece of equipment—her ironer.

season. In addition, a space was reserved on an outside wall for a modern laundry area.

Automatic Ironer First

The first appliance purchased was an automatic ironer. Mrs. Harris is just as enthusiastic about ironing this tireless way as she was the day she first used the ironer seven years ago. All of the ironing, the heavy work trousers and shirts, the dress shirts, draperies, curtains, bedding and linens are turned out with a professional touch while Mrs. Harris sits comfortably at the job and listens to her favorite radio programs.

Three years ago the complete modern laundry was installed. An automatic washer and dryer have a space near the window with the ironer alongside. To insure a constant and adequate supply of hot water, a 120 gallon electric water heater was located in a room off the kitchen.

With her new equipment Mrs. Harris no longer has a scheduled washday. She likes to do a load or two of clothes at a time rather than let soiled clothes accumulate in the hamper. This adds up to 10-12 loads of laundry a week. While the clothes are tumbling in the electric dryer, she heats up the ironer and immediately presses those garments that need ironing. This eliminates sprinkling because table linens, shirts and sheets are taken damp-dry from the dryer. In a matter of hours, sheets can go back on beds and towels are hung in the bathroom ready for use.

Leaves Time for Other Tasks

Hours of time are saved with this automatic laundry equipment. Hours that Mrs. Harris uses to process food for the 20 cubic foot freezer or to prepare hearty meals for the family. It is with justifiable pride that Mrs. Harris spoke of the changes and improvements made in her home over the years. For one who has had to live without the advantages of electricity, it is all the more appreciated. □ □

A Many-Purposed Appliance

Mrs. Robb Pryor lives in a large white house just off the main highway into Northfield, Minnesota. The day I called, she and her husband were picking black walnuts from their trees.

We went inside to look at her wonderful collection of African Violets, and our visit ended in Mrs. Pryor's sunny kitchen. There we sampled fresh chocolate cake and glasses of a frothy, sweet milk drink. "It's Lemon Shake", she said. "I just made a batch with my new electric blender. Every day I find a different use for it. Even this cake was made in the blender."

This was exciting news, and we discussed her new appliance. The attractive piece of kitchen equipment has a great number of uses and already she had used it for churning butter, chopping fruit for preserves and baking, whipping desserts, mixing batter, chopping and pulverizing vegetables, grating cheese, chocolate, and cocoanut —yes, even grinding coffee!

"I can discard a dozen of my old utensils and do the same jobs faster and more efficiently," said Mrs. Pryor. "The glass container comes off quickly and is easy to clean. There's a high-speed, sealed-in motor that does not have to be oiled."

Of course, I asked for the Lemon Shake recipe, and found the booklet that accompanied the blender full of tempting recipes and suggestions. Here are a few of Mrs. Pryor's favorites:

Lemon Shake

2 cups cold, rich milk
1 egg
pinch of salt
sugar or honey to taste
juice of 1 large lemon
yellow portion of ½ lemon rind
scoop chipped ice

Blend eggs. Add rind, sugar and lemon. Blend. Add milk and ice. Mix until frothy and smooth.

A new blender has found many uses in Mrs. Pryor's busy kitchen. Here she whips up a batch of delicious Lemon Shake to accompany the cake that was also made with her blender.

Chocolate Cream Icing

2 egg yolks, or 1 egg
¼ cup milk
1 cup powdered sugar
½ teaspoon vanilla
3 squares unsweetened chocolate, cut fine
1 tablespoon soft butter

Put all ingredients, except chocolate, in the container and begin blending process. Gradually add chocolate and continue mixing to a smooth creamy stage.

Cranberry Relish

2 cups raw cranberries
rind of 1 orange (yellow part only)
1 peeled orange, quartered
1 apple, quartered
2 tablespoons sugar

Blend cranberries and rind. Add orange and apple by quarters and continue blending. Add sugar and continue mixing until thoroughly blended. Chill and serve.

HELENA DAVIDSON

Demitasse coffee for two in just 60 seconds with this electric Espresso Coffee Machine. All kinds of "fancy" after-dinner brews can be concocted with this coffeemaker.

This coffeemaker has a capacity of 30 to 50 cups, yet stands only 18¾ inches high. Because it's a percolator the lifting of heavy kettles of hot water is eliminated, and because it's electric it is completely automatic.

Plug in the coffeemaker—

Plain or Fancy, Large or Small, Automatic Equipment to Suit One or All

What mental image do you get when the word "coffee" is mentioned? Most people, throughout the world, associate a cup of coffee with thoughts of friendly chats and get-togethers. A social meaning has been established by this popular beverage, thus the term "coffee-hour" denotes a time to relax, talk and sip a hot, delicious brew.

Because coffee is so popular, manufacturers have been stimulated into producing a whole battery of appliances whose sole purpose is to make this beverage automatically. And, because these coffeemakers produce such good results so easily, they have become extremely popular in recent years. In an increasing number of homes the expression "I'll put on the coffeepot" has been replaced by "I'll plug in the coffeemaker."

One of the most recent additions to this line of appliances is a 30-50 cup fully automatic percolator. This "large economy sized" coffeemaker is a perfect item for homes as well as for organizations. Family gatherings, parties, meetings, and harvest-time all mean that something friendly and hot, like a good cup of coffee, will be wanted. What could be better than an automatic coffeemaker large enough to make enough for all, plus seconds, in one pot?

The handling of messy coffee bags and the danger of lifting and pouring heavy kettles of boiling water is eliminated by this 50-cup percolator. Except for using larger quantities, coffee is made in the 50-cup coffeemaker in exactly the same way that it is made in an 8 or 10-cup pot. When the coffee is brewed a light flashes on while a low-heat unit takes over to keep the beverage hot for as long as needed.

For those of you who like an after dinner demitasse, there are a number of electrically operated "espresso" coffeemakers. These machines are imported from Italy, but are available all over

the United States. The espresso machine forces steam through the coffee, the steam is condensed, and the result is a strong and flavorful brew, with a decidedly continental air.

Whether it's good old-fashioned breakfast coffee from a 4-10 cup coffeemaker, coffee for a crowd from a 50-cup coffeemaker, or graciously served demitasse from a 2-4-cup caffe' espresso machine, the glory of all automatic coffeemakers lies in the fact that the same perfect results are obtained every time with no watching, timing or guessing.

Freezing and Refreezing

For highest quality, keep frozen foods frozen until they are defrosted for use, the U.S.D.A. advises. If frozen foods do thaw before needed, they may, under certain conditions, be safely refrozen. The process of thawing and refreezing does not in itself make fruits and vegetables unsafe. But thawed foods spoil more rapidly than fresh foods and may quickly become unsafe to eat if not refrigerated. Foods are not likely to be fit for refreezing if they have reached a temperature of 40°-45° F.

Both fruits and vegetables may be refrozen if they have not completely thawed or if they have been thawed for a short time and have been held in a household refrigerator. The thawing and refreezing will usually cause poorer quality and loss of flavor, however. Refrozen vegetables may toughen and refrozen fruits become soft and mushy. If flavor and texture of such refrozen fruits makes them unsatisfactory for eating uncooked, they may be satisfactory for use in cooking.

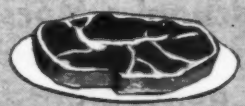
Because low-acid foods, which include most of the vegetables, spoil rapidly after they have thawed and warmed up to temperatures above 45° F., it's generally best not to refreeze. Acid foods, including most fruits and fruit products, are likely to ferment after they have thawed and warmed up to temperatures above 45° F. Slight fermentation of acid foods may change or spoil flavor but does not make them unsafe to eat.

You may freeze either baked or unbaked pie shells. Pastry may be rolled in circles and frozen, or it may be frozen in bulk. Thaw pastry or pastry circles completely, then use as usual.

Butter and homogenized milk or cream freeze very successfully. Cream or milk is best frozen in waxed cartons or freezer containers rather than in glass bottles. Milk, which has not been homogenized, is unappetizing after freezing because the fat separates from the liquid. Heavy whipping cream also may be frozen, either before or after whipping. Long frozen storage is not recommended for dairy products because quality deteriorates.

Which meat makes the best HAMBURGER?

PACKAGED GROUND



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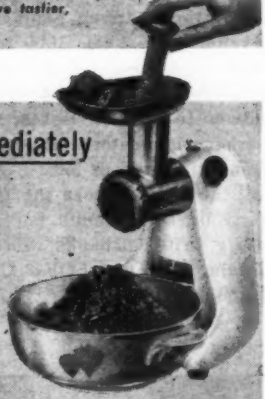

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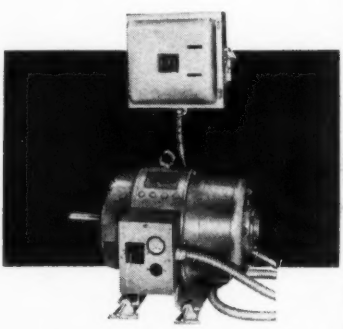

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How to Make the Most of What You Have

Equipment intended for something else can do double duty in the laundry

American ingenuity just won't stop—especially where women are concerned in their search for easier ways to do things. Somebody is always thinking up a new use for equipment originally intended for something else!

Take small electrical appliances for instance. Many of them, designed for anything from temperature control to cooking uses, turn out to be useful in the laundry department as well.

Did you know that:

An air conditioning unit is dandy for drying clothes that should not be placed near a direct source of heat? Place articles to be dried, such as woolens and synthetics, in front of the grill to catch the maximum circulation of air. They may be hung from a chair or spread flat over a nearby table or bed. Good to remember when traveling.

Your electrical fan can be used to speed clothes drying? Be sure to train the flow of air from the fan parallel to the line of hanging clothes. Fabrics dried in still air are more likely to grow stiff, while an artificial breeze from a fan helps to keep them soft, in the same way that an electric clothes dryer does. A hassock fan has some special uses. For example, a horsehair petticoat can be placed over the fan while holding the waistband; the petticoat will revolve like a carousel and dry in a matter of minutes.

Your hair dryer and portable electric heater are also naturals for drying a small wash. The warm air expelled helps to dry the atmosphere and thus speed moisture evaporation. Place either appliance at least several feet away from the moist articles to prevent their actually being heated. A hair dryer may also be used to speed the drying of lamp shades or china figurines.

A lilliputian clothes dryer can be improvised from an electric lamp? Squeeze out excess moisture in a bath towel, then spread small items over a cake rack set across the shade of a

Permanently pleated skirts and petticoats will dry quickly and wrinkles will disappear if they are hung in the upward air path of an electric fan.

Ironing isn't necessary if laundered slipcovers are put back while they are still damp. Seams and pleats can be smoothed out by finger pressing. Since the final drying is done on the furniture, and is hastened by an electric fan, the finished product will have a tighter and neater fit.

lighted lamp. The rising heat will produce a gentle drying action.

A vacuum cleaner with its hose attached to the end that blows, is great for drying large surfaces like furniture upholstery and rugs after suds-scrubbing; for drying freshly washed hair or clothes; and for fluffing washable pile fabrics like corduroy and velveteen.

The refrigerator is the place to keep your dampened laundry until it's time to iron? The moist cold helps spread dampness more evenly and keep it that way, and there's no chance of mildew. Also, chilled fabrics actually iron better.

An electric mixer is a whiz at whipping up "dry" soapsuds? This frothy form of soap is indispensible for sponging or brushing soil from surfaces and fabrics which should not be saturated with water—rugs and upholstery, jewelry, and leather, straw or plastic accessories. Beat up a lot of soap with a little water until it's stiff as meringue!

Your electric timer comes in handy for lots of jobs besides cooking? Use it for timing the brief soak periods required by some clothes, or set it as a novel way to remind the children to wash hands for dinner.

Although fans, air conditioners, hair dryers and space heaters can help to speed-up the drying process, nothing can take the place of the piece of equipment designed specifically for this purpose—the electric clothes dryer. □ □

Memo For A Rainy Day

Did you know that you can whip up the most beautiful "paints" out of laundry starch, food coloring, and *soap flakes?* Pre-school agers, who dote on finger painting, will love these homemade paints. And you can relax—all splashes are easily washed up afterward!

Just mix laundry starch with water, to the right consistency for starching clothes. Then separate the mixture into as many parts as you want different color paints. Add a different food coloring to every batch and thicken the mixtures by stirring in some soap flakes. The soap makes it all nice and slippery, and more fun to work with.

Little fingers will be fascinated to dabble around with such grand stuff. And this kind of paint can't hurt washable fabrics or surfaces—including Junior!

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Natalie Riggin, a 15-year-old 4-H'er from Olympia, Washington, poses with the cookies that won her a total of $10,000 in addition to a deluxe electric range, just like the one shown.

Bake-Off Contest Winner

Once again the lavish ballroom of the Waldorf-Astoria Hotel was turned into the world's largest kitchen. The event was the 8th Annual Pillsbury Bake-Off Contest held in New York City last December.

One hundred finalists from all parts of the country, each armed with their prize-winning recipe and a brand new electric range competed for over $100,000 in prizes. All of the finalists were chosen for the imagination they showed in home baking. The finalists fell into 3 categories; teenagers, brides, and experienced homemakers.

Each of the 100 contestants baked her prize-winning recipe four times in the electric range provided. If the contestant had not used an electric range before, she was given a chance to practice on one before the Bake-Off. An interesting observation of this event is that the cost of electricity to run the 100 ranges for the whole day was only $8.75.

This year a junior contestant, Natalie R. Riggin, 15, of Olympia, Washington won the Second Grand Prize of $5,000 for her Hoot Owl Cookies. In addition, Natalie also won another $5,000 from the American Dairy Association. Besides the total of $10,000 cash, Natalie, and all of the other finalists, each received a General Electric Range, just like the one they used.

Natalie Riggin is a pretty lucky young lady, but then she worked hard for the honors. She is the daughter of Mr. and Mrs. Harold E. Riggin and lives on a farm near Olympia. Natalie likes to bake and specializes in cookies and cakes. Her mother taught her to cook and she helps regularly in preparing family meals. She says her "Hoot Owl Cookies", which won her the Second Grand Prize, were a family project too.

Natalie is active in 4-H club work. She raises horses and cows and won a red ribbon on her calf at the county fair. Her "Hoot Owl Butter Cookies" were made from a refrigerator dough, and cleverly shaped like an owl's head. A piece of chocolate forms the owl's eye. Natalie says that she'll use her prize money to complete her education and her sister's. □ □

Glorified Sandwiches

Chicken and cheese combine to make hot, hearty and delicious eating

To most Americans, sandwich is a word that means good eating. If there is any doubt about it, look to restaurant menus and the numbers of books devoted solely to the many enticing combinations. All families have their favorites and from the lunchbox content to after school snack, the sandwich has its place of importance.

A few simple and unusual steps of preparation and the sandwich can be turned into a really fine production. Such is the case with Chicken Rabbit Sandwich. Slices of chicken are placed on toast and covered with a delicious cheese sauce. It is then popped under the broiler for a matter of minutes and is ready to serve. Sliced ham, veal, turkey, or canned luncheon meat may be used instead of chicken.

Chicken Rabbit Sandwich

2 tablespoons butter
2 tablespoons flour
1 cup milk
½ pound American cheese
½ teaspoon prepared yellow mustard
1 teaspoon Worcestershire sauce
Salt to taste
6 slices crisp toast
Sliced, cooked chicken
Paprika

1. Melt butter in a saucepan, add flour and blend.
2. Add milk and cook until mixture boils and thickens, stirring constantly.
3. Add cheese, mustard, Worcestershire sauce, and salt to taste, and stir over very low heat only until cheese is melted.
4. Arrange toast in individual custard cups, or one shallow baking pan; top with thick slices of chicken.
5. Cover with cheese sauce and sprinkle lightly with paprika.
6. Heat under broiler only until cheese sauce begins to brown lightly.
7. Serve at once with a lettuce cup of crisp cole slaw or assorted relishes.

Makes 6 servings.

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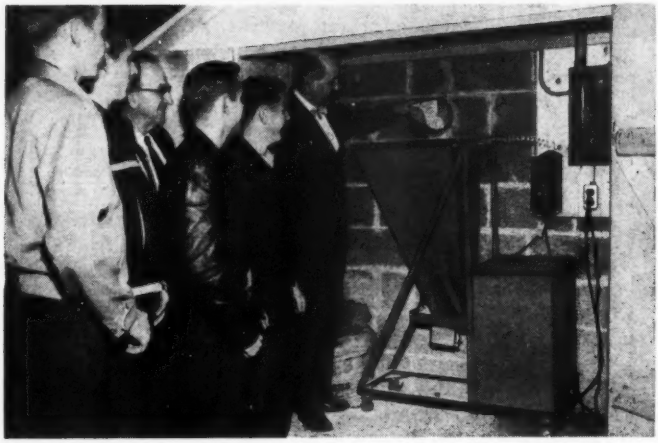
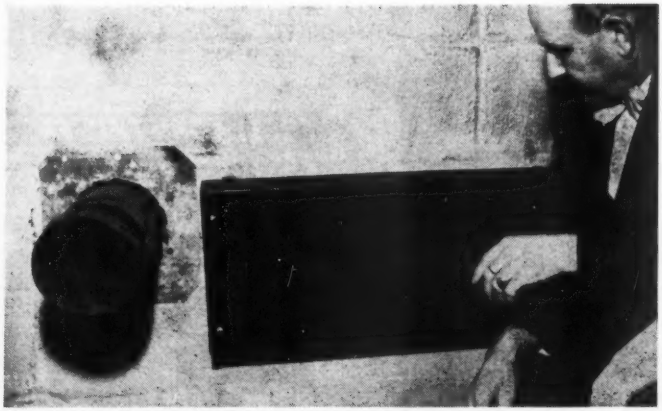


Heart of the "fireless" smokehouse is this sawdust toasting machine. Sawdust is poured into hopper and fed into smoke generating box by a vibrator mechanism. One scoop of sawdust is equivalent to a dozen large logs in the conventional smokehouse.

FFA Class Produces Champion Hams with Electric Smokehouse

By **JOSEPH E. HOFFMAN**



Smoke from the toaster is blown into smokeroom through pipe at left. Heaters shown keep hams at the proper temperature to be most receptive to the delicious smoke flavor.

Electricity has entered the bacon and ham curing industry in West Virginia. The result is a better product produced with less labor and cost.

The introduction of electric power into this operation was made by the Vo-Ag class at the Clay-Battelle High School. Under the supervision of their Vo-Ag teacher, A. R. Bryant, the class converted an "old fashioned" smokehouse into a new, all-electric installation. They received technical assistance from their power supplier's representatives and a state college extension agricultural engineer.

The new all-electric smokehouse has several advantages over the "old fashioned" type. As listed by Bryant, some of these are:

- Controlled heat
- Controlled humidity
- Safety against fire
- Less labor to operate
- More economical as to wood consumption
- Cleaner, more uniformly colored hams or bacons
- Less meat spoilage
- All-round better quality product

The new smokehouse can accomplish these advantages, thanks to automatic operations made possible by the use of electricity. The house is kept at a uniform room temperature by three 230-volt, 3000-watt thermostatically controlled unit heaters. A commercially built sawdust toasting unit is used to produce an even and constant supply of smoke. Smoke is circulated through the house by a blower. Sawdust from green hickory and sassafras logs is used to create the smoke. It was obtained fom a local sawmill at a very small cost. Two bags of sawdust will produce the same amount of smoked meat as two cords of wood in the "old fashioned" house.

The house is 8 feet by 10 feet. It is of concrete block construction. It will accommodate about 75 pieces of meat at one time. The entire conversion cost about $400. This cost is rapidly being recovered in less spoilage, lower wood cost and a saving of time. Besides this, the class is doing some custom smoking.

Proof of success in an operation of this type is the end product—in this case the sugar cured and hickory smoked hams and bacons. Last year, at the State FFA Ham and Bacon Show at Charleston, the bacons entered by the Clay-Battelle High School took both Grand Championship and Reserve Championship. □ □

More National 4-H Winners

Top honors go to girls specializing in food freezing, food preparation, food canning, and clothing achievement projects

Chicago was a mighty busy place during the 35th National 4-H Club Congress recently held there. Last month we reported on 4-H winners in electrical projects. This month we present the National winners in Canning, Clothing, Food Preparation and Frozen Foods.

State winners in each project division received an all-expense trip to Club Congress. National Champs each received a bonus $300 scholarship, sponsored by the individual award donors for their particular division. The projects are conducted by the Extension Service of State Agricultural Colleges and the United States Department of Agriculture, while the Club Congress program is arranged by the National Committee on Boys and Girls Club Work.

Frozen Foods

The girls in this division of 4-H work learn to use freezing equipment efficiently to provide the farm family with an ample supply of home-grown food. Their skills are developed in the preparation, packaging and freezing of all meats, eggs, fruits and vegetables.

Award donor for this division was Whirlpool-Seeger Corporation. A $300 scholarship was presented to each of the 6 national

Food freezing winners were each awarded $300 scholarship by Mason Smith (right), vice president-treasurer of Whirlpool-Seeger Corp. They included (l to r) Nancy Kunnemen, Sarah Nell Taylor, Vicky Scheuerer, Phyllis Baker, Jeanene Markussen.

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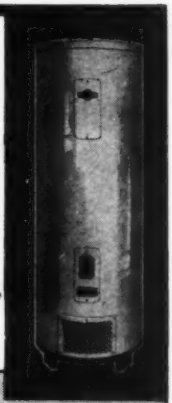

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winners. These winners are Phyllis Baker, 18, Indianapolis, Indiana; Nancy Kunneman, 17, Okarche, Oklahoma; Jeanene Markussen, 16, Lincoln, Nebraska; Evalyn Mills, 17, Port Byron, New York; Vicky Scheuerer, 17, Nampa, Idaho; and Sarah Nell Taylor, 18, Laurel, Mississippi.

Food Preparation

The program objectives of this division are to teach girls how to plan, cook and serve meals. It also educates them on the importance of eating nourishing foods for good health. Members are urged to improve the eating habits of their families. The program stresses the use of home produced vegetables, fruits, poultry and meats.

Each of the eight national food preparation winners received a $300 college scholarship from Kelvinator Division of American Motors Corp. Here Mrs. Arleen Arnold, director of the Kelvinator Institute for Better Living discusses the project with national winners. They are (l. to r.) Ruth Martin, Sylvia Ann Swart, Phoebe Hodges, Faye Robertson, Carol Hamann, Ann Schwarm and Vivian Tucker. The 90,000,000 represents the number of meals prepared in the program during the past 7 years.

Kelvinator Division, American Motors Corporation presented $300 scholarships to each of the 8 national winners. The winners are Carol Hamann, 17, Eldridge, Iowa; Phoebe Hodges, 17, Orlando, Florida; Ruth Martin, 18, Corning, California; V. Ann Schwarm, 19, East Hartford, Connecticut; Sylvia Ann Swart, 17, Drummond, Oklahoma; Vivian Thomas Tucker, 18, West End, North Carolina; Mary Karen Reef, 17, Lancaster, Ohio; and Faye Robertson, 19, Ralph, Ala.

Clothing Achievement

The clothing achievement division encourages girls to develop skills in selecting, constructing and caring for wardrobes suitable for work, school, and social events. It also teaches them to dress becomingly and healthfully in keeping with a well-planned family budget.

The $300 scholarships were presented by Coats and Clark, Inc. to the following national winners: Carol Benson, 19, Elburn, Illinois; Jean Cogburn, 19, Marietta, Georgia; Alice Crook, 16, Fallon, Nevada; Barbara Jean David, 18, Winfield, Kansas; Willa Jean Lane, 19, Visalia, California; Ethel Ann Rosely, 17, Pattenburg, New Jersey; Janet Ross, 18, Keota, Iowa; and Phylis Williamson, 17, Wildwood, Florida.

Canning Achievement

The objectives of the canning division are to encourage girls to develop their skills in the preservation of fruits, vegetables and meats, thus increasing the year-around food supply by canning for the family. The program stresses the use of home-grown produce to promote a well-balanced diet and to reduce the family's cash expenditures for food. And no one can can like these girls can.

Kerr Glass Manufacturing Corporation awarded $300 scholarships to the 6 national winners. The winners are Martha Lee Coles, 17, Bent Mountain, Virginia; Carol Jean Comins, 17, Clayton, New York; Barbara Forster, 17, Great Falls, Montana; Marijane Gosch, 18, Schaller, Iowa; Ann Noe, 18, Tulsa, Oklahoma; and Jo Ann Nute, 19, Loomis, California.

• • •

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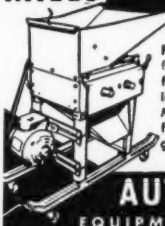

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Water-Logged Pressure Tanks

▶**Question:** *Our water pump now starts just as soon as you open a faucet—or in other words we can perhaps draw two quarts of water but no more. Anything that you can suggest to remedy this situation will be appreciated.*

D.E., New Hampshire

▶**Answer:** Your trouble is a water-logged pressure tank, one containing too much water and not enough air. The amount of water that can be withdrawn from a pressure tank between cut-off and cut-on pressures depends upon the amount of air in the tank. A tank without proper air charge is useless for reserve purposes and causes the pump motor to start and stop much more frequently than is necessary, working a hardship on both motor and pressure switch.

Water-logging is caused by either an air leak in the pressure tank or improper operation of the air charging device on the pump. Well piping sloping downward from the well top to an offset pump will also cause it, due to water flowing to the pump not allowing it to operate on the suction cycle.

For correction of the situation, the first step is to check for air leaks in the tank. To make this test, place soap suds around the top plug and welded seams. Any bubbling of the suds will indicate presence of air leaks in this area.

Next, see if the air valve on the pump is taking in air between minimum operating pressure, 20 lbs., and 8 pounds above minimum operating pressure or 28 lbs. Hold your finger over the small hole located in the body of the air volume control on the pressure tank while pump is operating between 20 and 28 lbs. If it is not taking in air, the air valve core should be replaced. Be sure to use a correct valve core. The automobile tire valve core looks like and will fit in the snifter valve. The tire valve core has a much stronger spring, however, and will prevent the snifter valve from operating.

The cause may also be the air volume control float in the pressure tank. If it is water-logged or stuck in the downward position, it should be replaced.

Cooling Milk in Winter

▶**Question:** *During these cold winter months, why can't we use the cold weather to cool milk in place of our milk cooler?*

E. W., Iowa

▶**Answer:** Milk should be cooled down to 50°F. within 2 hours after milking to prevent bacteria from growing. This rate of cooling is almost impossible when depending upon only cool air. Poor cooling causes "malty" flavored milk. Since a great amount of milk is bought on a grade basis, poor cooling might also result in lower quality and in turn a lower grade milk and less profit for you.

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Whenever you need further information about electrical equipment and appliances, you can depend upon the Manufacturers who are advertising in this magazine. We have indexed here for your convenience in alphabetical order the 28 Manufacturers whose advertising is appearing in this February issue.

When writing to these manufacturers be sure to mention you saw their advertising in ELECTRICITY ON THE FARM Magazine.

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ELECTRICITY ON THE FARM 2-57

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Please have sent to me, without obligation, the names of manufacturers of:

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Motor Wiring....

(Here from page 15)

vices which permit the motor to be started and stopped by means of remotely controlled push buttons or automatically. These controls are usually of the magnetic type. The automatic operation may be actuated by changes in temperature, humidity, pressure, light intensity, current flow, or other variables as a time clock.

Protect Motor Against Overloading

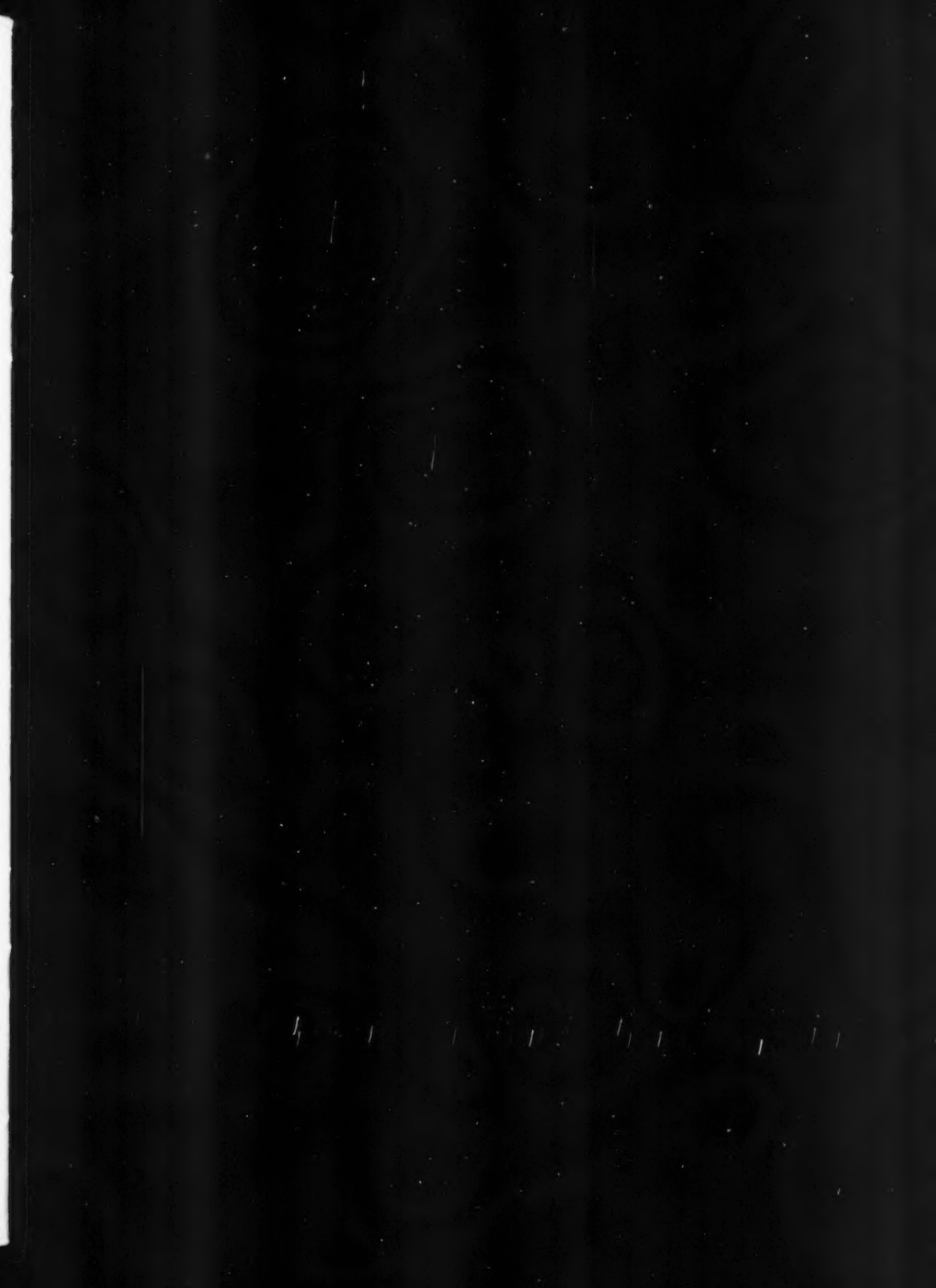
A good motor control design will also include over-current protection for the motor. This device will remove the motor from the line when excessive current is drawn, thus preventing damage to the motor.

Time delay fuses will carry overload currents of short duration such as motor starting current without melting but will melt and break the circuit when a prolonged overload is applied. Proper selection of such a fuse (usually rated at 125% of motor full load current) provides adequate motor running overload protection and still permits the motor to be started.

Heater coils are usually an integral part of a controller but are available as separate devices. This device operates in much the same way as a fuse with the exception that it can be reset after it has broken the circuit and cooled down. A fuse is destroyed on breaking and must be replaced.

Built-in motor protection is provided by the motor manufacturer. This device is built into the motor and is designed to take the motor off the line when excessive current or high motor temperature occurs. These devices may be automatic or manual reset.

It is usually advisable to consult the motor supplier as to the proper size or rating to be used for control units, heater coils, and fuses. Properly selected and applied control equipment can make the operation of any motor much more efficient, safe and convenient. □ □



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grain elevator	elevate 167 bu. of grain
a milking machine	milk 20 cows
a feed conveyor	move 2000 lbs. to feed bunks
livestock waterers	provide ice-free water for 8 hrs.
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farm freezer	keep food frozen 5 hrs.
chick brooding	brood 1 chick for 30 days
pig brooding	provide heat for 2 hrs.
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